Description

A Bead Trimmer with a Tool Extraction System.

Technical Field

The invention relates to a bead trimmer with a tool extraction system. The field of use of the invention is lines of production of shaped elements, especially tubes, with longitudinal weld beads.

Background Art

The tubes are made from steel sheets which are moved and wound longitudinally to define the outside surface of the tube. The longitudinal edges of the sheet are welded together to close the tube, with a longitudinal weld bead. An external excess of bead has to be removed in the production line, in order to achieve a sufficiently regular external surface. The excess bead is usually removed mechanically using sharp tools which are brought into contact with the tube at a generatrix thereof along which the welding has been performed. The sliding longitudinal motion of the tube is also the movement used during the bead-trimming operation, the trimming tool remaining stationary.

In order not to halt production during tool replacement operations, two trimmers are arranged in the production line. During the tool-replacement operation on a first bead trimmer, the second is activated until the trimmer thereon has to be substituted, at which point the first trimmer is reactivated, and so on for successive cycles.

At present tool replacement is done manually and directly on the production line, by an operative. The operative is susceptible to considerable risks of injury, as he must work in proximity of the moving tube, as well as in proximity of the shaved

beading emerging from the working bead trimmer. As well as this, the tool-changing operation is rather slow and awkward, as the operative is forced to bend forwards, towards the axis of the tube from a frontal position with respect to the shape of the base of the machine, preventing him from getting any closer.

The main aim of the present invention is to provide a bead trimmer provided with a tool extraction system, which obviates the drawbacks in the prior art.

An advantage of the invention is that is enables the tool to be changed in a safe and comfortable position for the operative.

A further advantage of the invention is that repositioning the tool after replacement is done automatically, rapidly and precisely.

Disclosure of Invention

Further characteristics and advantages of the present invention will better emerge from the detailed description that follows of a preferred but non-exclusive embodiment of a bead trimming machine with a tool extraction system, illustrated purely by way of a non-limiting example in the accompanying figures of the drawings, in which:

figure 1 is a schematic perspective view of the bead trimmer of the present invention in a tool-changing position;

figure 2 is a schematic perspective view of the bead trimmer of the invention in an operating condition;

figure 3 is a sectioned detail of the bead trimmer of the invention.

With reference to the figures of the drawings, the bead trimmer of the invention comprises a tool-bearing turret 2 for removable fixture of a bead trimmer 30 tool, for example of a type having a cutting edge made on a carbide plate. The turret 2 is supported by means for controlled translation in at least one vertical direction z and at least one horizontal direction y which is transversal with respect to the longitudinal axis x between an internal work position and an external tool-

changing position, with a run sufficient for extracting the turret 2 from the work zone.

The means for controlled translation comprise a first slide 3, to which the turret 2 is associated, which is slidable along the horizontal direction y between the internal work position, in which the tool 30 is aligned with the weld bead 21, and the external position for tool changing, in which the tool 30 is not aligned with the weld bead 21. The axis x is parallel to the sliding direction of the tube 20. The first slide 3 is associated to an intermediate slide 34 which is associated in turn to a second slide 4 which is slidable vertically on a bearing structure 40 along direction z between a lowered position, in which the tool 30 is in contact with the weld bead 21, and a raised position, in which the tool 30 is distanced from the weld bead 21.

The first slide 3 comprises an elongate portion of guide 5, vertically gripped between at least three wheels 6, associated to the intermediate slide 34, which exhibit rotation axes which are parallel to the axis x and are conformed in such a way as to prevent displacements of the first slide 3 along direction x and along direction z. The first slide 3 can be translated along direction y by a first actuator cylinder 7, which has a stem thereof connected to the first slide 3 and a body thereof connected to the intermediate slide 34. The wheels 6, which peripherally exhibit a gulley predisposed to engage on the lateral side of the portion of guide 5, are mounted on supports provided with elastic means predisposed to enable the wheels 6 to move in direction x.

The intermediate slide 34 is mobile along direction y with respect to the second slide 4 by means of a calibration mechanism 16, for example a screw-nut type mechanism, which enables a correct centring of the tool 30 with respect to the weld bead 21.

The second slide 4 is vertically slidable between two parallel guides 8 by means

of a second actuator cylinder 9 which is operatively arranged between the second slide 4 and a vertical calibration mechanism 15, for example a screw-nut mechanism, which is operatively arranged between the second actuator cylinder 9 and a portion of the bearing structure 40.

The first slide 3 is blockable, with respect to the intermediate guide 34, when it is in an internal position, by means of a blocking device 11 which comprises a blocking and unblocking cylinder, operatively arranged between the first slide 3 and the intermediate slide 34, a stem of which exhibits a flange 17 predisposed to operate internally of a T-shaped hollow afforded on the first slide 3. The blocking and unblocking cylinder 12 is predisposed to exert a traction when at rest, by means of elastic means such as Belleville washers arranged coaxially to the stem, on the first slide 3 and to pull the first slide 3 into contact with the intermediate slide 34. When activated, the blocking and unblocking cylinder 12 exerts a force which is opposed to the force exerted by the elastic means and frees the first slide 3 from contact with the intermediate slide 34. The blocking and unblocking cylinder 12 operates in collaboration with a horizontal sliding guide 13, associated with the intermediate slide 34, which exhibits a wedge-shape in transversal section and which is predisposed to insert in a channel shaped specially therefor and afforded on the first slide 3, when the cylinder 12 is in the rest position. The sliding guide 13 is conformed and predisposed to define a vertical-direction reference with respect to the turret 2.

The invention offers considerable advantages. Firstly, the tool change can be performed in a safe position, as the operative can distance the turret from the production line. Both the displacement from the work position to the change-tool position, and the return to the work position, can be performed automatically, with considerable increase in the rapidity of the tool-changing operations. In particular the re-positioning of the tool after changing is performed rapidly and,

especially, precisely thanks to the use of guides and calibration systems for the described positions.